

Wherefore, I/we claim:

1. A punch and die tooling apparatus comprising:
 - a punch and a die for forming a hole in a metal plate;
 - a die body defining a vertical through bore extending between a top and a bottom surface of the die body;
 - a horizontally extending ridge formed on a first portion of a wall of the through bore for engaging a portion of a slug cut from the metal plate and tipping the slug away from a face of the punch;
 - a partially circumferential relief formed on a second portion of the wall substantially opposite from the horizontally extending ridge to facilitate the tipping of the slug away from the face of the punch.
2. The punch and die tooling apparatus as set forth in claim 1, wherein the partially circumferential relief is formed vertically closer to the top surface of the die body than the horizontally extending ridge to provide an adequate space to prevent jamming of the tipping slug in the through bore of the die.
3. The punch and die tooling apparatus as set forth in claim 1, wherein the partially circumferential relief defines a relief area extending between the circumferential relief and the bottom surface of the die body.
4. The punch and die tooling apparatus as set forth in claim 1, wherein the horizontally extending ridge and the partially circumferential relief are formed by an overlapping upper and lower offset bores.
5. The punch and die tooling apparatus as set forth in claim 4, wherein the lower bore is larger than the upper bore.
6. A die for a punch and die tooling apparatus comprising:
 - a die body defining a through bore extending between a top and a bottom surface of the die body, the through bore further comprising;
 - an upper bore defining a cutting edge on the top surface of the die body and extending partially through the die along a first longitudinal axis;
 - a lower bore defining a bottom opening on the bottom surface of the die and extending partially through the die along a second longitudinal axis to connect with the top bore;
 - wherein the second longitudinal axis is parallel to and offset from the first axis to form a first and a second opposing ledges at an intersection of the upper and lower bores in the through bore.

7. The die as set forth in claim 6 further comprising an overlapping section of the upper and lower bores formed at an intermediate portion of the through bore to define a longitudinal spacing between the first and second opposing ledges.

8. The die as set forth in claim 6 wherein the lower bore is formed having a slightly larger diameter than the upper bore.

9. The die as set forth in claim 6 wherein the first ledge is formed having a larger radial area and a longer circumferential length than the opposing second ledge.

10. The die as set forth in claim 9 wherein the first ledge defines a first substantially horizontal surface area defining an area of relief in the through bore extending downwards from the first substantially horizontal surface area to the bottom opening of the lower bore.

11. A method of forming a die for a punch and die tooling machine comprising the steps of:

forming a through bore in a die body extending between a top and a bottom surface of the die body, the formation of the through bore further comprising the steps of;

machining a lower bore in the die body to define a bottom opening on the bottom surface of the die and extending partially through the die along a second longitudinal axis parallel to and offset from the first axis to form;

machining an upper bore in the die body to define a cutting edge on the top surface of the die body and extending partially through the die along a first longitudinal axis to connect the upper bore and the lower bore; and

overlapping the upper bore with the lower bore to create a first and a second opposing ledges at an intersection of the upper and lower bores within the through bore.